CLAIMS

What is claimed is:

1. A circuit board adapted to suppress electromagnetic interference, the circuit board comprising:

an electrically conductive transmission layer defining a circuit pattern;

a ferrite-containing medium spaced from the electrically conductive transmission layer; and

an insulating layer, positioned between the transmission layer and the ferrite layer.

2. The circuit board of claim 1, wherein the ferrite layer comprises a plurality of spaced apart ferrite layer regions.

3. The circuit board of claim 1, wherein the ferrite layer is not connected to an electrically conductive material.

4. The circuit board of claim 1, wherein the ferrite layer further comprises a paint.

5. The circuit board of claim 1, wherein the ferrite layer further comprises an epoxy.

6. The circuit board of claim 1, wherein the ferrite layer consists essentially of a ferrite powder.

7. The circuit board of claim 1, wherein the insulating layer comprises a substrate for the transmission layer.

8. The circuit board of claim 1, wherein the ferrite powder has a particle size of greater than about six tenths of a micron and less than about ten microns and has an imaginary component of a complex permeability of more than about 10;

the ferrite layer has an effective thickness of greater than about 0.0005 inches and less than about 0.06 inches has a loss factor of greater than 0.0001; and

the ferrite layer is configured to magnetically couple to an electromagnetic signal in the transmission layer where the electromagnetic signal is more than about 1 MHz and less than about 300 GHz.

9. The circuit board of claim 1, wherein the ferrite powder has a particle size of more than about 1 micron and less than about 5 microns and has an imaginary component of a complex permeability of more than about 100 for at least one frequency of more than about 20 MHz and less than about 1 GHz and the ferrite powder has a flux density of at least about 2000 gauss;

the ferrite layer has an effective thickness of greater than about 0.005 inches and less than about 0.01 inches;

the ferrite layer has a loss factor of greater than 0.0005; and

the ferrite layer can magnetically couple to an electromagnetic signal in the transmission layer where the electromagnetic signal is more than about 20 MHz and less than about 1 GHz.

10. The circuit board of claim 1, further comprising a captivating layer that maintains the ferrite layer on the circuit board.

11. A circuit board for reducing undesired electromagnetic signals, the circuit board comprising:

an electrically conductive transmission line configured to conduct an electrical signal and an electromagnetic signal;

a ferrite-containing medium that magnetically couples with the electromagnetic signal on the circuit board to absorb and dissipate the electromagnetic signals; and

an insulating material positioned between the electrically conductive transmission line and the ferrite-containing medium, the insulating layer being adapted to maintain the electrical signal in the transmission line from reaching the ferrite containing medium while permitting transmission of the electromagnetic signals between the ferrite-containing medium and the transmission line.

12. A circuit board of claim 11, further comprising a captivating material that maintains the ferrite-containing medium on the circuit board.

13. A circuit board of claim 11, wherein the electromagnetic signal is an RF signal.

14. The circuit board of claim 11, wherein the ferrite-containing medium comprises an adhesive that adheres the ferrite-containing medium to the circuit board.

15. The circuit board of claim 11, wherein the insulating material selected from the group consisting of solder flux, paint, prepreg, plastic, ceramic, microwave dielectric, fiberglass and ceramic-filled PTFE.

16. A method for treating a circuit board to reduce undesired electromagnetic signals, the method comprising

providing a circuit board having at least one electrically conductive transmission line capable of conducting an electrical signals and an electromagnetic signal, the circuit board further comprising an insulating layer capable of maintaining the electrical signal in the

transmission line while permitting transmission of the electromagnetic signal from the transmission line;

providing a ferrite-containing medium having physical properties that render it capable of magnetically coupling to the electromagnetic signal;

contacting the ferrite-containing medium onto the circuit board such that the insulating layer is between the ferrite-containing medium and the transmission line and that electromagnetic signals from the transmission layer can be couple with the ferrite-containing medium.

17. The method for treating circuit boards of claim 16, further comprising the step of captivating the ferrite-containing medium on the circuit board so that the captivated ferrite containing medium remains in contact with the circuit board.

18. The method for treating a circuit board of claim 16, wherein the step of contacting the ferrite containing medium onto the circuit board comprises screening the ferrite-containing medium onto the circuit board.

19. The method for treating a circuit board of claim 16, wherein the step of contacting the ferrite-containing medium to the circuit board further comprises screening the ferrite-containing medium onto a captivating layer and adhering the captivating layer to the circuit board.

20. The method of claim 16, wherein the ferrite-containing medium is a powder.

21. The method of claim 16, wherein the ferrite-containing medium is a paint.

22. The method of claim 16, wherein the ferrite-containing medium comprises prepreg.

23. The method of claim 16, wherein the ferrite-containing medium comprises an epoxy.

24. The method of claim 16, wherein the ferrite-containing medium is contacted to the circuit board above the transmission line to provide broadside coupling between the ferrite-containing layer and the transmission line.

25. The method of claim 16, wherein the ferrite-containing medium is contacted to the circuit board in a layer, the layer having an effective layer thickness of ferrite equal to the percentage of ferrite present in the medium times an actual layer thickness, wherein the effective thickness is greater than about 0.0005 inches and less than about 0.06 inches.

26. A method of making a circuit board adapted to suppress electromagnetic interference comprising the steps of:

providing a circuit board having an electrically conductive transmission layer defining a circuit pattern ,and an insulating layer operatively positioned to permit transmission of electromagnetic interference through the insulating layer; and

forming a ferrite layer comprising a ferrite powder on the circuit board, the ferrite layer spaced from the electrically conductive layer transmission layer and positioned between the ferrite layer and the transmission layer.

27. The method of claim 26, wherein the ferrite layer comprises a plurality of spaced apart ferrite layer regions.

28. The method of claim 26, wherein the step of forming the ferrite layer on the circuit board comprises screening the ferrite layer onto the circuit board.

29. The method of claim 26, wherein the ferrite layer comprises a ferrite powder having a particle size of greater than about six tenths of a micron and less than about ten microns;

the ferrite powder has an imaginary component of a complex permeability of the ferrite powder is more than about 10 for at least one radio or microwave frequency;

the ferrite powder is formed on the circuit board with an effective thickness of greater than about 0.0005 inches and less than about 0.06 inches

the ferrite powder has a loss factor of greater than 0.0001; and

the ferrite powder is formed on the circuit board in a configuration to magnetically couple to an electromagnetic signal in the transmission layer where the electromagnetic signal is more than about 1 MHz and less than about 300 GHz.

30. The method of claim 26 wherein the ferrite layer comprises a ferrite powder has a particle size of more than about 1 micron and less than about 5 microns;

the ferrite powder and has an imaginary component of a complex permeability of the ferrite powder is more than about 100 frequencies of more than about 20 MHz and less than about 1 GHz;

the ferrite powder has a flux density of at least about 2000 gauss;

the ferrite powder is formed on the circuit board with an effective thickness of greater than about 0.005 inches and less than about 0.01 inches and is further characterized in that the ferrite layer has a loss factor of greater than 0.0005; and

the ferrite layer is formed on the circuit board in a configuration that magnetically couples to an electromagnetic signal in the transmission layer where the electromagnetic signal having some frequency of more than about 20 MHz and less than about 1 GHz.

31. A circuit board adapted to suppress electromagnetic interference, the circuit board comprising:

an electrically conductive transmission layer defining a circuit pattern;

a ferrite layer comprising a ferrite powder spaced from the electrically conductive transmission layer; and

an insulating layer, positioned between the transmission layer and the ferrite layer, wherein the insulating layer permits transmission of the electromagnetic interference through the insulating layer.